

$$I(J^P) = 1(\frac{1}{2}^+) \text{ Status: } ***$$

We have omitted some results that have been superseded by later experiments. See our earlier editions.

Σ^+ MASS

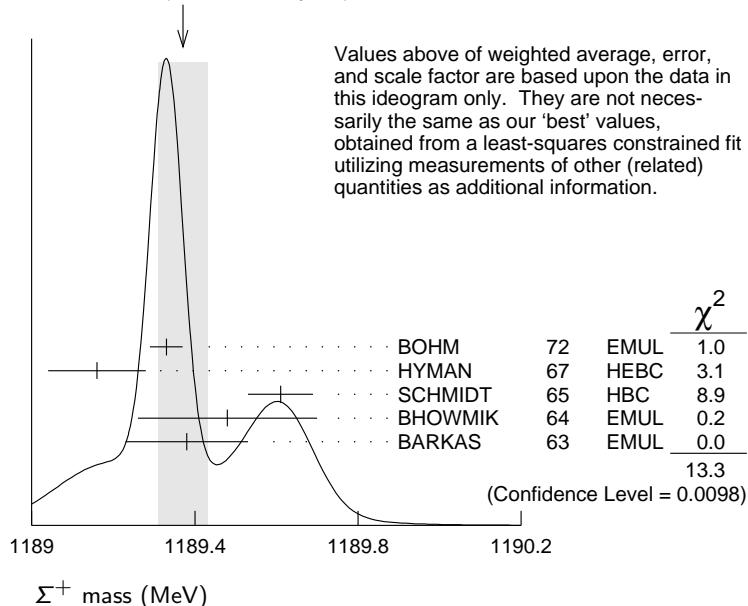
The fit uses Σ^+ , Σ^0 , Σ^- , and Λ mass and mass-difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1189.37±0.07 OUR FIT		Error includes scale factor of 2.2.		
1189.37±0.06 OUR AVERAGE		Error includes scale factor of 1.8. See the ideogram below.		
1189.33±0.04	607	1 BOHM	72 EMUL	
1189.16±0.12		HYMAN	67 HEBC	
1189.61±0.08	4205	SCHMIDT	65 HBC	See note with Λ mass
1189.48±0.22	58	2 BHOWMIK	64 EMUL	
1189.38±0.15	144	2 BARKAS	63 EMUL	

¹ BOHM 72 is updated with our 1973 K^- , π^- , and π^0 masses (Reviews of Modern Physics **45** S1 (1973)).

² These masses have been raised 30 keV to take into account a 46 keV increase in the proton mass and a 21 keV decrease in the π^0 mass (note added 1967 edition, Reviews of Modern Physics **39** 1 (1967)).

WEIGHTED AVERAGE
1189.37±0.06 (Error scaled by 1.8)



Σ^+ MEAN LIFE

Measurements with fewer than 1000 events have been omitted.

VALUE (10^{-10} s)	EVTS	DOCUMENT ID	TECN	COMMENT
0.8018±0.0026 OUR AVERAGE				
0.8038±0.0040±0.0014		BARBOSA 00	E761	hyperons, 375 GeV
0.8043±0.0080±0.0014	³ 30k	BARBOSA 00	E761	hyperons, 375 GeV
0.798 ± 0.005		MARRAFFINO 80	HBC	$K^- p$ 0.42–0.5 GeV/c
0.807 ± 0.013	5719	CONFORTO 76	HBC	$K^- p$ 1–1.4 GeV/c
0.795 ± 0.010	20k	EISELE 70	HBC	$K^- p$ at rest
0.803 ± 0.008	10664	BARLOUTAUD 69	HBC	$K^- p$ 0.4–1.2 GeV/c
0.83 ± 0.032	1300	⁴ CHANG 66	HBC	

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NODE=S019M

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NODE=S019M;LINKAGE=S

NODE=S019T

NODE=S019T

NODE=S019T

OCCUR=2

³This is a measurement of the $\bar{\Sigma}^-$ lifetime. Here we assume *CPT* invariance; see below for the fractional $\Sigma^+ - \bar{\Sigma}^-$ lifetime difference obtained by BARBOSA 00.

⁴We have increased the CHANG 66 error of 0.018; see our 1970 edition, *Reviews of Modern Physics* **42** 87 (1970).

$$(\tau_{\Sigma^+} - \tau_{\bar{\Sigma}^-}) / \tau_{\Sigma^+}$$

A test of *CPT* invariance.

VALUE	DOCUMENT ID	TECN	COMMENT
$(-6 \pm 12) \times 10^{-4}$	BARBOSA 00	E761	hyperons, 375 GeV

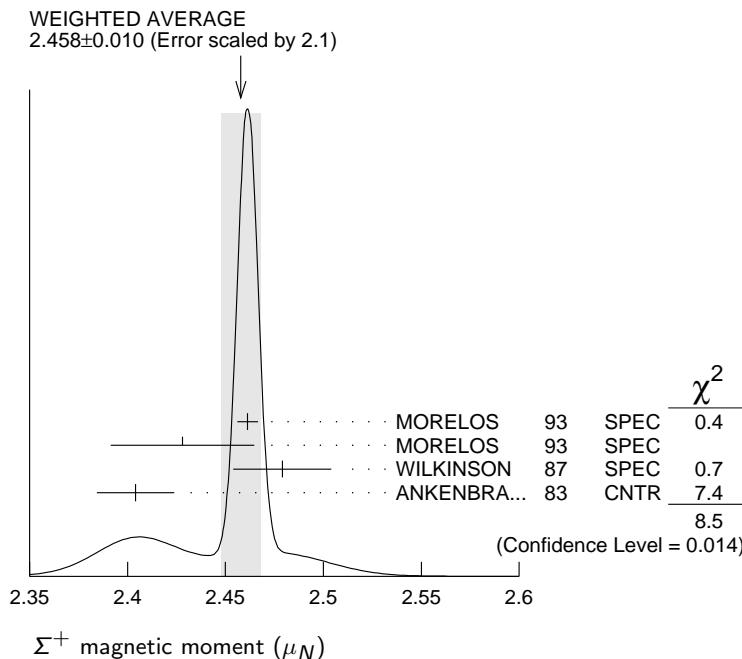
Σ^+ MAGNETIC MOMENT

See the "Note on Baryon Magnetic Moments" in the Λ Listings. Measurements with an error $\geq 0.1 \mu_N$ have been omitted.

VALUE (μ_N)	EVTS	DOCUMENT ID	TECN	COMMENT
2.458 ± 0.010 OUR AVERAGE				Error includes scale factor of 2.1. See the ideogram below.
2.4613 $\pm 0.0034 \pm 0.0040$	250k	MORELOS	93	SPEC $p\text{Cu}$ 800 GeV
2.428 $\pm 0.036 \pm 0.007$	12k	5 MORELOS	93	SPEC $p\text{Cu}$ 800 GeV
2.479 $\pm 0.012 \pm 0.022$	137k	WILKINSON	87	SPEC $p\text{Be}$ 400 GeV
2.4040 ± 0.0198	44k	6 ANKENBRA...	83	CNTR $p\text{Cu}$ 400 GeV

⁵We assume *CPT* invariance: this is (minus) the $\bar{\Sigma}^-$ magnetic moment as measured by MORELOS 93. See below for the moment difference testing *CPT*.

⁶ANKENBRANDT 83 gives the value $2.38 \pm 0.02 \mu_N$. MORELOS 93 uses the same hyperon magnet and channel and claims to determine the field integral better, leading to the revised value given here.



$$(\mu_{\Sigma^+} + \mu_{\bar{\Sigma}^-}) / \mu_{\Sigma^+}$$

A test of *CPT* invariance.

VALUE	DOCUMENT ID	TECN	COMMENT
0.014 ± 0.015	7 MORELOS 93	SPEC	$p\text{Cu}$ 800 GeV

⁷This is our calculation from the MORELOS 93 measurements of the Σ^+ and $\bar{\Sigma}^-$ magnetic moments given above. The statistical error on $\mu_{\bar{\Sigma}^-}$ dominates the error here.

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NODE=S019MM;LINKAGE=A

NODE=S019MM;LINKAGE=B

NODE=S019MMD

NODE=S019MMD

NODE=S019MMD

NODE=S019MMD;LINKAGE=A

Σ^+ DECAY MODES

NODE=S019220;NODE=S019

Mode	Fraction (Γ_i/Γ)	Confidence level
$\Gamma_1 p\pi^0$	$(51.57 \pm 0.30) \%$	
$\Gamma_2 n\pi^+$	$(48.31 \pm 0.30) \%$	
$\Gamma_3 p\gamma$	$(1.23 \pm 0.05) \times 10^{-3}$	
$\Gamma_4 n\pi^+\gamma$	[a] $(4.5 \pm 0.5) \times 10^{-4}$	
$\Gamma_5 \Lambda e^+ \nu_e$	$(2.0 \pm 0.5) \times 10^{-5}$	

**$\Delta S = \Delta Q$ (SQ) violating modes or
 $\Delta S = 1$ weak neutral current (S1) modes**

$\Gamma_6 ne^+ \nu_e$	SQ	< 5	$\times 10^{-6}$	90%
$\Gamma_7 n\mu^+ \nu_\mu$	SQ	< 3.0	$\times 10^{-5}$	90%
$\Gamma_8 pe^+ e^-$	S1	< 7	$\times 10^{-6}$	
$\Gamma_9 p\mu^+ \mu^-$	S1	(9 ± 9)	$\times 10^{-8}$	

[a] See the Listings below for the pion momentum range used in this measurement.

NODE=S019;CLUMP=A

DESIG=7;OUR LIM; \rightarrow UNCHECKED \leftarrow
 DESIG=6;OUR LIM; \rightarrow UNCHECKED \leftarrow
 DESIG=8
 DESIG=9

LINKAGE=SD

CONSTRAINED FIT INFORMATION

An overall fit to 2 branching ratios uses 14 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 = 7.7$ for 12 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

$$\begin{array}{c|cc} & -100 & \\ \hline x_2 & 12 & -14 \\ x_3 & & \\ \hline & x_1 & x_2 \end{array}$$

 Σ^+ BRANCHING RATIOS

NODE=S019225

$\Gamma(n\pi^+)/\Gamma(N\pi)$	EVTS	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$\Gamma_2/(\Gamma_1+\Gamma_2)$
0.4836 ± 0.0030 OUR FIT					
0.4836 ± 0.0030 OUR AVERAGE					
0.4828 ± 0.0036	10k	⁸ MARRAFFINO 80	HBC	$K^- p$ 0.42–0.5 GeV/c	
0.488 ± 0.008	1861	NOWAK 78	HBC		
0.484 ± 0.015	537	TOVEE 71	EMUL		
0.488 ± 0.010	1331	BARLOUTAUD 69	HBC	$K^- p$ 0.4–1.2 GeV/c	
0.46 ± 0.02	534	CHANG 66	HBC		
0.490 ± 0.024	308	HUMPHREY 62	HBC		

NODE=S019R1

NODE=S019R1

⁸ MARRAFFINO 80 actually gives $\Gamma(p\pi^0)/\Gamma(\text{total}) = 0.5172 \pm 0.0036$.

NODE=S019R1;LINKAGE=M

$\Gamma(p\gamma)/\Gamma(p\pi^0)$	EVTS	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	Γ_3/Γ_1
2.38 ± 0.10 OUR FIT					
2.38 ± 0.10 OUR AVERAGE					
2.32 $\pm 0.11 \pm 0.10$	32k	TIMM 95	E761	Σ^+ 375 GeV	
2.81 $\pm 0.39 \pm 0.21$	408	HESSEY 89	CNTR	$K^- p \rightarrow \Sigma^+ \pi^-$ at rest	
2.52 ± 0.28	190	⁹ KOBAYASHI 87	CNTR	$\pi^+ p \rightarrow \Sigma^+ K^+$	
2.46 ± 0.30	155	BIAGI 85	CNTR	CERN hyperon beam	
2.11 ± 0.38	46	MANZ 80	HBC	$K^- p \rightarrow \Sigma^+ \pi^-$	
2.1 ± 0.3	45	ANG 69B	HBC	$K^- p$ at rest	
2.76 ± 0.51	31	GERSHWIN 69B	HBC	$K^- p \rightarrow \Sigma^+ \pi^-$	
3.7 ± 0.8	24	BAZIN 65	HBC	$K^- p$ at rest	

NODE=S019R4

NODE=S019R4

⁹ KOBAYASHI 87 actually gives $\Gamma(p\gamma)/\Gamma(\text{total}) = (1.30 \pm 0.15) \times 10^{-3}$.

NODE=S019R4;LINKAGE=M

$\Gamma(n\pi^+\gamma)/\Gamma(n\pi^+)$

The π^+ momentum cuts differ, so we do not average the results but simply use the latest value in the Summary Table.

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
0.93±0.10	180	EBENHOH	73	HBC $\pi^+ < 150 \text{ MeV}/c$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.27±0.05	29	ANG	69B	HBC $\pi^+ < 110 \text{ MeV}/c$
~1.8		BAZIN	65B	HBC $\pi^+ < 116 \text{ MeV}/c$

 Γ_4/Γ_2

NODE=S019R2

NODE=S019R2

NODE=S019R2

 $\Gamma(\Lambda e^+\nu_e)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
2.0±0.5 OUR AVERAGE				
1.6±0.7	5	BALTAY	69	HBC $K^- p$ at rest
2.9±1.0	10	EISELE	69	HBC $K^- p$ at rest
2.0±0.8	6	BARASH	67	HBC $K^- p$ at rest

NODE=S019R3

NODE=S019R3

 $\Gamma(ne^+\nu_e)/\Gamma(n\pi^+)$ Γ_6/Γ_2

Test of $\Delta S = \Delta Q$ rule. Experiments with an effective denominator less than 100,000 have been omitted.

EFFECTIVE DENOM.	EVTS	DOCUMENT ID	TECN	COMMENT
<1.1×10⁻⁵ OUR LIMIT Our 90% CL limit = (2.3 events)/(effective denominator sum). [Number of events increased to 2.3 for a 90% confidence level.]				
111000	0	10 EBENHOH	74	HBC $K^- p$ at rest
105000	0	10 SECHI-ZORN	73	HBC $K^- p$ at rest

NODE=S019R5

NODE=S019R5

NODE=S019R5

→ UNCHECKED ←

10 Effective denominator calculated by us.

 $\Gamma(n\mu^+\nu_\mu)/\Gamma(n\pi^+)$ Γ_7/Γ_2

Test of $\Delta S = \Delta Q$ rule.

EFFECTIVE DENOM.	EVTS	DOCUMENT ID	TECN
<6.2×10⁻⁵ OUR LIMIT Our 90% CL limit = (6.7 events)/(effective denominator sum). [Number of events increased to 6.7 for a 90% confidence level.]			
33800	0	BAGGETT	69B HBC
62000	2	11 EISELE	69B HBC
10150	0	12 COURANT	64 HBC
1710	0	12 NAUENBERG	64 HBC
120	1	GALTIERI	62 EMUL

NODE=S019R5;LINKAGE=U

NODE=S019R6

NODE=S019R6

NODE=S019R6

11 Effective denominator calculated by us.

12 Effective denominator taken from EISELE 67.

 $\Gamma(pe^+\epsilon^-)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
<7	13	ANG	69B	HBC $K^- p$ at rest
13 ANG 69B found three $pe^+\epsilon^-$ events in agreement with $\gamma \rightarrow e^+e^-$ conversion from $\Sigma^+ \rightarrow p\gamma$. The limit given here is for neutral currents.				

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NODE=S019R6;LINKAGE=E

NODE=S019R8

NODE=S019R8

NODE=S019R8;LINKAGE=A1

 $\Gamma(p\mu^+\mu^-)/\Gamma_{\text{total}}$ Γ_9/Γ

A test for a $\Delta S = 1$ weak neutral current, but also allowed by higher-order electroweak interactions.

VALUE (units 10^{-8})	EVTS	DOCUMENT ID	TECN	COMMENT
8.6^{+6.6}_{-5.4}±5.5	3	14 PARK	05	HYCP p Cu, 800 GeV

NODE=S019R8

NODE=S019R8

NODE=S019R12

NODE=S019R12

NODE=S019R12

NODE=S019R12;LINKAGE=PA

14 The masses of the three dimuons of PARK 05 are within 1 MeV of one another, perhaps indicating the existence of a new state P^0 with mass 214.3 ± 0.5 MeV. In that case, the decay is $\Sigma^+ \rightarrow pP^0$, $P^0 \rightarrow \mu^+\mu^-$, with a branching fraction of $(3.1^{+2.4}_{-1.9} \pm 1.5) \times 10^{-8}$.

 $\Gamma(\Sigma^+ \rightarrow ne^+\nu_e)/\Gamma(\Sigma^- \rightarrow ne^-\bar{\nu}_e)$ Γ_6/Γ_3^Σ

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<0.009 OUR LIMIT Our 90% CL limit, using $\Gamma(ne^+\nu_e)/\Gamma(n\pi^+)$ above.					

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NODE=S019R10

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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.019	90	0	EBENHOH	74	HBC $K^- p$ at rest
<0.018	90	0	SECHI-ZORN	73	HBC $K^- p$ at rest
<0.12	95	0	COLE	71	HBC $K^- p$ at rest
<0.03	90	0	EISELE	69B	HBC See EBENHOH 74

$\Gamma(\Sigma^+ \rightarrow n\mu^+\nu_\mu)/\Gamma(\Sigma^- \rightarrow n\mu^-\bar{\nu}_\mu)$					$\Gamma_7/\Gamma_4^{\Sigma^-}$
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
<0.12 OUR LIMIT	Our 90% CL limit, using $\Gamma(n\mu^+\nu_\mu)/\Gamma(n\pi^+)$ above.				
• • •	We do not use the following data for averages, fits, limits, etc. • • •				
0.06 ^{+0.045} -0.03	2	EISELE	69B HBC	$K^- p$ at rest	
$\Gamma(\Sigma^+ \rightarrow n\ell^+\nu)/\Gamma(\Sigma^- \rightarrow n\ell^-\bar{\nu})$					$(\Gamma_6 + \Gamma_7)/(\Gamma_3^{\Sigma^-} + \Gamma_4^{\Sigma^-})$
Test of $\Delta S = \Delta Q$ rule.					
VALUE	EVTS	DOCUMENT ID	TECN		
<0.043 OUR LIMIT	Our 90% CL limit, using $[\Gamma(ne^+\nu_e) + \Gamma(n\mu^+\nu_\mu)]/\Gamma(n\pi^+)$.				
• • •	We do not use the following data for averages, fits, limits, etc. • • •				
<0.08	1	NORTON	69	HBC	
<0.034	0	BAGGETT	67	HBC	

Σ^+ DECAY PARAMETERS

See the "Note on Baryon Decay Parameters" in the neutron Listings. A few early results have been omitted.

α_0 FOR $\Sigma^+ \rightarrow p\pi^0$					
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
-0.980^{+0.017} -0.015 OUR FIT					
-0.980^{+0.017} -0.013 OUR AVERAGE					
-0.945 ^{+0.055} -0.042	1259	15 LIPMAN	73 OSPK	$\pi^+ p \rightarrow \Sigma^+$	
-0.940 \pm 0.045	16k	BELLAMY	72 ASPK	$\pi^+ p \rightarrow \Sigma^+ K^+$	
-0.98 ^{+0.05} -0.02	1335	16 HARRIS	70 OSPK	$\pi^+ p \rightarrow \Sigma^+ K^+$	
-0.999 \pm 0.022	32k	BANGERTER	69 HBC	$K^- p$ 0.4 GeV/c	

15 Decay protons scattered off aluminum.

16 Decay protons scattered off carbon.

ϕ_0 ANGLE FOR $\Sigma^+ \rightarrow p\pi^0$					
VALUE (°)	EVTS	DOCUMENT ID	TECN	COMMENT	$(\tan \phi_0 = \beta/\gamma)$
36 \pm34 OUR AVERAGE					
38.1 ^{+35.7} -37.1	1259	17 LIPMAN	73 OSPK	$\pi^+ p \rightarrow \Sigma^+ K^+$	
22 \pm 90		18 HARRIS	70 OSPK	$\pi^+ p \rightarrow \Sigma^+ K^+$	

17 Decay proton scattered off aluminum.

18 Decay protons scattered off carbon.

α_+/ α_0					
Older results have been omitted.					
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
-0.069\pm0.013 OUR FIT					
-0.073\pm0.021	23k	MARRAFFINO	80 HBC	$K^- p$ 0.42–0.5 GeV/c	

α_+ FOR $\Sigma^+ \rightarrow n\pi^+$					
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
0.068\pm0.013 OUR FIT					
0.066\pm0.016 OUR AVERAGE					
0.037 \pm 0.049	4101	BERLEY	70B HBC		
0.069 \pm 0.017	35k	BANGERTER	69 HBC	$K^- p$ 0.4 GeV/c	

ϕ_+ ANGLE FOR $\Sigma^+ \rightarrow n\pi^+$					
VALUE (°)	EVTS	DOCUMENT ID	TECN	COMMENT	$(\tan \phi_+ = \beta/\gamma)$
167\pm20 OUR AVERAGE	Error includes scale factor of 1.1.				
184 \pm 24	1054	19 BERLEY	70B HBC		
143 \pm 29	560	BANGERTER	69B HBC	$K^- p$ 0.4 GeV/c	

19 Changed from 176 to 184° to agree with our sign convention.

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NODE=S019R7
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NODE=S019R7

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NODE=S019A+

NODE=S019F+
NODE=S019F+

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α_γ FOR $\Sigma^+ \rightarrow p\gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
-0.76 ± 0.08 OUR AVERAGE				
-0.720 ± 0.086 ± 0.045	35k	20 FOUCHER	92 SPEC	Σ^+ 375 GeV
-0.86 ± 0.13 ± 0.04	190	KOBAYASHI	87 CNTR	$\pi^+ p \rightarrow \Sigma^+ K^+$
-0.53 + 0.38 - 0.36	46	MANZ	80 HBC	$K^- p \rightarrow \Sigma^+ \pi^-$
-1.03 + 0.52 - 0.42	61	GERSHWIN	69B HBC	$K^- p \rightarrow \Sigma^+ \pi^-$

20 See TIMM 95 for a detailed description of the analysis.

 Σ^+ REFERENCES

We have omitted some papers that have been superseded by later experiments. See our earlier editions.

PARK	05	PRL 94 021801	H.K. Park <i>et al.</i>	(FNAL HyperCP Collab.)	REFID=50480
BARBOSA	00	PR D61 031101	R.F. Barbosa <i>et al.</i>	(FNAL E761 Collab.)	REFID=47344
TIMM	95	PR D51 4638	S. Timm <i>et al.</i>	(FNAL E761 Collab.)	REFID=44221
MORELOS	93	PRL 71 3417	A. Morelos <i>et al.</i>	(FNAL E761 Collab.)	REFID=43575
FOUCHER	92	PRL 68 3004	M. Foucher <i>et al.</i>	(FNAL E761 Collab.)	REFID=41995
HESSEY	89	ZPHY C42 175	N.P. Hessey <i>et al.</i>	(BNL-811 Collab.)	REFID=40776
KOBAYASHI	87	PRL 59 868	M. Kobayashi <i>et al.</i>	(KYOT)	REFID=40133
WILKINSON	87	PRL 58 855	C.A. Wilkinson <i>et al.</i>	(WISC, MICH, RUTG+)	REFID=11909
BIAGI	85	ZPHY C28 495	S.F. Biagi <i>et al.</i>	(CERN WA62 Collab.)	REFID=11908
ANKENBRA... ⁸³	PRL 51 863	C.M. Ankenbrandt <i>et al.</i>	(FNAL, IOWA, ISU+)	REFID=11907	
MANZ	80	PL 96B 217	A. Manz <i>et al.</i>	(MPIM, VAND)	REFID=11905
MARRAFFINO	80	PR D21 2501	J. Marraffino <i>et al.</i>	(VAND, MPIM)	REFID=11906
NOVAK	78	NP B139 61	R.J. Nowak <i>et al.</i>	(LOUC, BELG, DURH+)	REFID=11903
CONFORTO	76	NP B105 189	B. Conforto <i>et al.</i>	(RHEL, LOIC)	REFID=11900
EBENHOH	74	ZPHY 266 367	H. Ebenhoh <i>et al.</i>	(HEIDT)	REFID=11899
EBENHOH	73	ZPHY 264 413	W. Ebenhoh <i>et al.</i>	(HEIDT)	REFID=11895
LIPMAN	73	PL 43B 89	N.H. Lipman <i>et al.</i>	(RHEL, SUSS, LOWC)	REFID=11896
PDG	73	RMP 45 S1	T.A. Lasinski <i>et al.</i>	(LBL, BRAN, CERN+)	REFID=41172
SECHI-ZORN	73	PR D8 12	B. Sechi-Zorn, G.A. Snow	(UMD)	REFID=11898
BELLAMY	72	PL 39B 299	E.H. Bellamy <i>et al.</i>	(LOWC, RHEL, SUSS)	REFID=11892
BOHM	72	NP B48 1	G. Bohm <i>et al.</i>	(BERL, KIDR, BRUX, IASD+)	REFID=11893
Also		IHE-73.2 Nov	G. Bohm	(BERL, KIDR, BRUX, IASD, DUUC+)	REFID=11894
COLE	71	PR D4 631	J. Cole <i>et al.</i>	(STON, COLU)	REFID=11890
TOVEE	71	NP B33 493	D.N. Tovee <i>et al.</i>	(LOUC, KIDR, BERL+)	REFID=11891
BERLEY	70B	PR D1 2015	D. Berley <i>et al.</i>	(BNL, MASA, YALE)	REFID=11885
EISELE	70	ZPHY 238 372	F. Eisele <i>et al.</i>	(HEID)	REFID=11886
HARRIS	70	PRL 24 165	F. Harris <i>et al.</i>	(MICH, WISC)	REFID=11887
PDG	70	RMP 42 87	A. Barbaro-Galtieri <i>et al.</i>	(LRL, BRAN+)	REFID=41173
ANG	69B	ZPHY 228 151	G. Ang <i>et al.</i>	(HEID)	REFID=11952
BAGGETT	69B	Thesis MDDP-TR-973	N.V. Baggett	(UMD)	REFID=11875
BALTAJ	69	PRL 22 615	C. Baltay <i>et al.</i>	(COLU, STON)	REFID=11876
BANGERTER	69	Thesis UCRL 19244	R.O. Bangerter	(LRL)	REFID=11877
BANGERTER	69B	PR 187 1821	R.O. Bangerter <i>et al.</i>	(LRL)	REFID=11878
BARLOUTAUD	69	NP B14 153	R. Barloutaud <i>et al.</i>	(SACL, CERN, HEID)	REFID=11879
EISELE	69	ZPHY 221 1	F. Eisele <i>et al.</i>	(HEID)	REFID=11880
Also		PRL 13 291	W. Willis <i>et al.</i>	(BNL, CERN, HEID, UMD)	REFID=11849
EISELE	69B	ZPHY 221 401	F. Eisele <i>et al.</i>	(HEID)	REFID=11881
GERSHWIN	69B	PR 188 2077	L.K. Gershwin <i>et al.</i>	(LRL)	REFID=11882
Also		Thesis UCRL 19246	L.K. Gershwin	(LRL)	REFID=11883
NORTON	69	Thesis Nevis 175	H. Norton	(COLU)	REFID=11967
BAGGETT	67	PRL 19 1458	N. Baggett <i>et al.</i>	(UMD)	REFID=11862
Also		Vienna Abs. 374	N.V. Baggett, B. Kehoe	(UMD)	REFID=11863
Also		Private Comm.	N.V. Baggett	(UMD)	REFID=11864
BARASH	67	PRL 19 181	N. Barash <i>et al.</i>	(UMD)	REFID=11865
EISELE	67	ZPHY 205 409	F. Eisele <i>et al.</i>	(HEID)	REFID=11866
HYMAN	67	PL 25B 376	L.G. Hyman <i>et al.</i>	(ANL, CMU, NWES)	REFID=10122
PDG	67	RMP 39 1	A.H. Rosenfeld <i>et al.</i>	(LRL, CERN, YALE)	REFID=41171
CHANG	66	PR 151 1081	C.Y. Chang	(COLU)	REFID=11940
Also		Thesis Nevis 145	C.Y. Chang	(COLU)	REFID=11859
BAZIN	65	PRL 14 154	M. Bazin <i>et al.</i>	(PRIN, COLU)	REFID=11851
BAZIN	65B	PR 140B 1358	M. Bazin <i>et al.</i>	(PRIN, RUTG, COLU)	REFID=11938
SCHMIDT	65	PR 140B 1328	P. Schmidt	(COLU)	REFID=11768
BHOWMIK	64	NP 53 22	B. Bhowmik <i>et al.</i>	(DELH)	REFID=11844
COURANT	64	PR 136 B1791	H. Courant <i>et al.</i>	(CERN, HEID, UMD+)	REFID=11846
NAUENBERG	64	PRL 12 679	U. Nauenberg <i>et al.</i>	(COLU, RUTG, PRIN)	REFID=11848
BARKAS	63	PRL 11 26	W.H. Barkas, J.N. Dyer, H.H. Heckman	(LRL)	REFID=10865
Also		Thesis UCRL 9450	J.N. Dyer	(LRL)	REFID=11843
GALTIERI	62	PRL 9 26	A. Barbaro-Galtieri <i>et al.</i>	(LRL)	REFID=11839
HUMPHREY	62	PR 127 1305	W.E. Humphrey, R.R. Ross	(LRL)	REFID=11743